CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Synoptic Evaluation of Drinking Water Constituents of Concern in the Sacramento River and San Joaquin River Basins

Final Technical Memorandum Report

December 2014*

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

*California Department of Public Health (DPH) was changed to the State Water Resources Control Board's Division of Drinking Water (DDW) to reflect current programs in Attachment 2 on March 16, 2015.

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REGIONAL WATER QUALITY CONTROL BOARD
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ACKNOWLEDGEMENTS:

This report was made possible through field and lab work, quality assurance, data compilation and data analysis, primarily performed by staff of the AG Regulatory Planning Unit and Scientific Aids of the California State Surface Water Ambient Monitoring Program (SWAMP). Additional resources were provided through the Central Valley Salinity Alternatives Long-Term Sustainability (CV-SALTS) initiative and local stakeholders including the water agencies that are currently managing and maintaining the water bodies in question.

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1.0 GLOSSARY/KEY TERMS

ACL – Administrative Civil Liability

Ag – Agricultural

Central Valley Water Board – Central Valley Regional Water Quality Control Board

CTR – California Toxics Rule

DO – Dissolved Oxygen

E. coli – Escherichia coli

MCLs – Maximum Contaminant Levels

MPN – Most Probable Number

MUN – Municipal and Domestic Supply

QAPrP – Quality Assurance Program Plan

RL – Reporting Limit

SC – Specific Conductance

State Water Board – State Water Resources Control Board

SWAMP – Surface Water Ambient Monitoring Program

TDS – Total Dissolved Solids

USEPA – U.S. Environmental Protection Agency

2.0 INTRODUCTON

The purpose of this study was to evaluate current water quality within representative agricultural (Ag) drains and main stem Sacramento River and San Joaquin River sites, against Title 22 Maximum Contaminant Levels (MCLs), California Toxics Rule (CTR), and other water quality thresholds (provided in Attachment 2) for constituents without a MCL or CTR to determine whether water quality may be suitable for municipal and domestic supply (MUN) and protective of human health from the consumption of drinking water. Sampling of the study's 11 sites was conducted over two days (25 June and 30 June 2014), and each designated site was sampled once for this study.

The main question being asked of this study is:

- During a one time snapshot of the irrigation period, do Ag return flows exceed or cause the main stems of the Sacramento River and/or San Joaquin River to exceed human health water quality criteria for the protection form the consumption of drinking water?

To help answer the main question, the following primary objectives were established:

- Collect representative samples in main Ag drains discharging into either the Sacramento River or San Joaquin River and the rivers themselves;
- Determine spatial distribution of any detectible constituent concentrations of concern; and;
- Identify whether criteria developed to protect human health from the consumption of drinking water are exceeded.

This technical memorandum reviews the study design, tabulates resulting data, and provides a summary evaluation related to the above question and objectives.

2.0 STUDY DESIGN OVERVIEW

Eleven sites were sampled for this study and represented major Ag drainages as well as sites in each main river stem upstream and downstream of the Ag inflows (Table 1). Figures 1 and 2 are maps of the sampling locations.

Field parameters included temperature, dissolved oxygen (DO), pH, specific conductance (SC) and turbidity. In addition, photos documentation of the water level at each site is summarized in Attachment 1. *E. coli* was added to the monitoring effort as well and was compared to the USEPA Recreational Guideline for Designated Beach Areas.

Samples were also analyzed for MCLs specified in Title 22 of the California Code of Regulations, California Toxics Rule (CTR), and other numeric water quality criteria listed in Attachment 2 for constituents without a MCL or CTR. For constituents with both a MCL and CTR criteria, the most conservative numeric threshold was selected for water quality evaluation. For constituents without a MCL and CTR criteria, the most appropriate for protecting MUN beneficial use numeric water quality criteria was selected for water quality evaluation.

A full list of constituents that have MUN water quality evaluation criteria is provided in Attachment 2. Evaluation criteria values were obtained from the State Water Board's Water Quality Goals database. Not all of the constituents listed in Attachment 2 were analyzed in this study due to scan variations provided by the laboratory.

All aspects of this study, including all samples and field measurements collected, were conducted in accordance with the Procedures Manual for the San Joaquin River Water Quality Monitoring Program (Central Valley Water Board, 2010) which is compliant with the 2008 SWAMP (Surface Water Ambient Monitoring Program) Quality Assurance Program Plan (QAPrP) for the State of California's Surface Water Ambient Monitoring Program (State Water Board, 2008).

Table 1 Sampling Sites

Location	Map Label	Station Code	Sites	Latitude	Longitude
Sacramento River	37	520CBDKLU	**Colusa Basin Drain** above Knights Landing	38.7992	-121.725
	38	520CRCOOH	**Sutter Bypass** downstream of Obanion Outfall	39.0258	-121.7272
	39	520YOL001	**Sacramento River** at Rough and Ready Pumping Plant	38.8621	-121.7927
	40	519SACVER	**Sacramento River** Below Verona	38.7797	-121.6037
San Joaquin River	30	541MER531	**Salt Slough** at Lander Avenue	37.24797	-120.85225
	31	541XSSASD	**Salt Slough** at Sand Dam	37.13664	-120.76194
	32	541MER050	**Boundary Drain** at SLCC Sampling Station	37.10949	-120.78275
	33	535STC504	**San Joaquin River** at Crows Landing	37.43323	-121.01597
	34	535STC501	**Harding Drain**	37.46444	-121.03028
	35	541SJC501	**San Joaquin River** at Airport Way near Vernalis	37.67556	-121.26417
	36	541STC516	**Del Puerto Creek** at Vineyard Road	37.52139	-121.14861

NOTE: Map Labels match locations depicted in Figures 1 and 2.

Figure 1 Sacramento River Sampling Sites

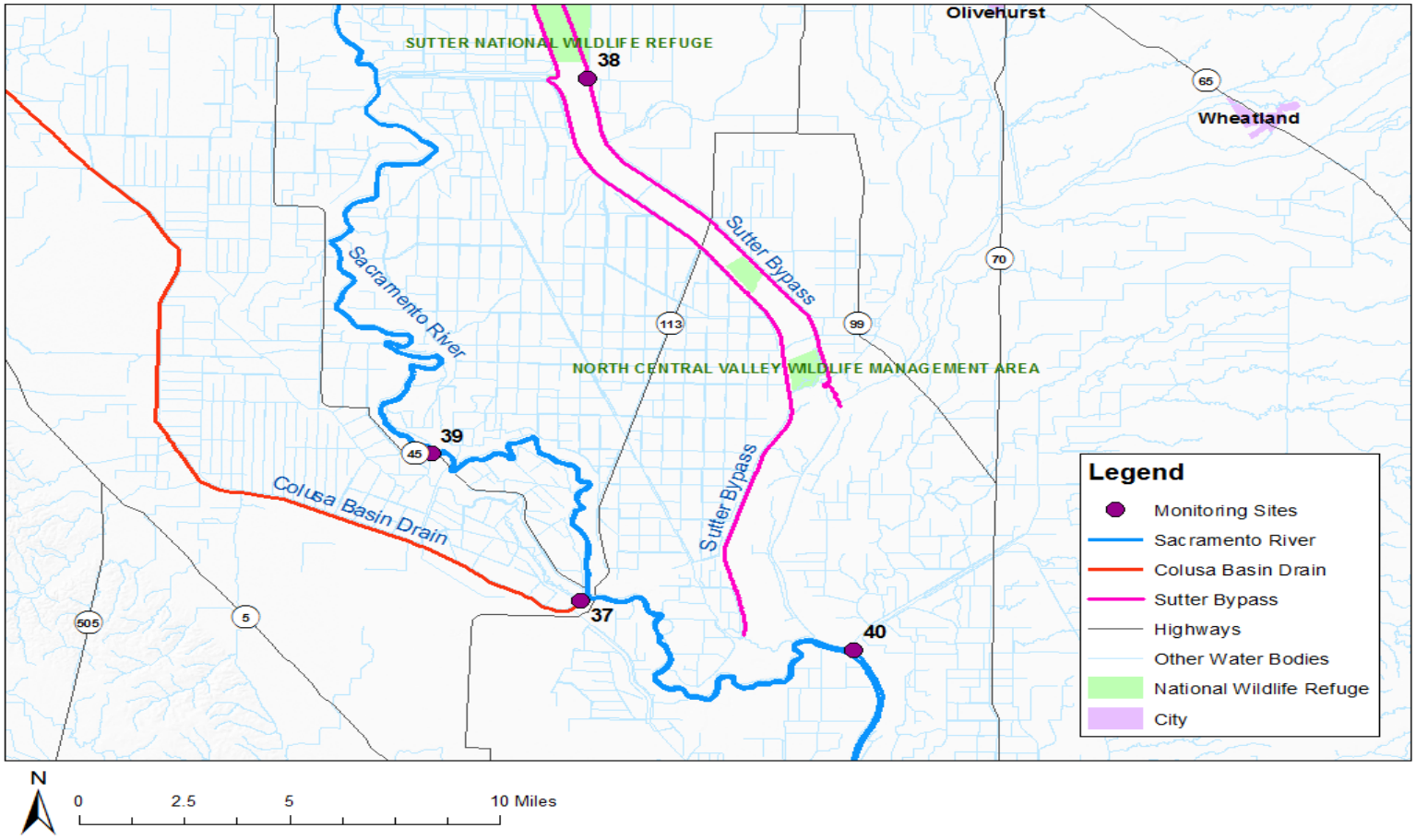
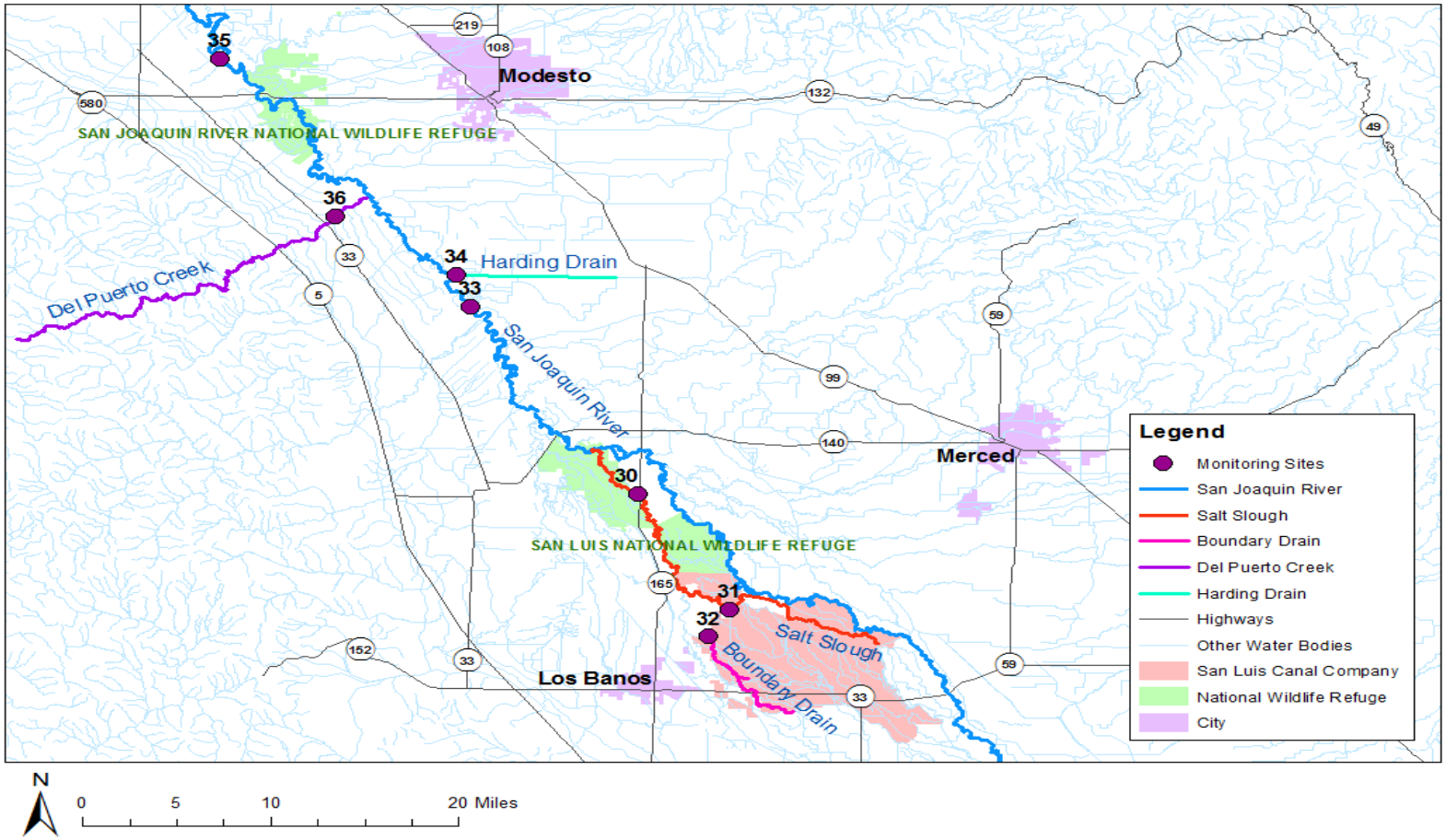


Figure 2 San Joaquin River Sampling Sites



3.0 CONDITIONS

Sampling was conducted during the third driest water year in California historical records and followed a dry water year (2012) and a critical water year (2013) in the San Joaquin Valley, and a below normal water year (2012) and dry water year (2013) in the Sacramento Valley. Currently the state of California is considered to be in an extreme drought. The California Department of Water Resources reports less than 50 percent of normal precipitation from October 2013 to late May 2014 (DWR, 2014), leading to extremely low flows in surface water ways and extensive reuse of available water supplies.

Each sampling site was visually documented with three photographs: downstream of the sampling site; across the channel; and upstream (Attachment 1).

4.0 RESULTS

All constituent analytical results that met QA/QC objectives, along with reporting limits (RL) and units are reported in Table 2. Analytical methods utilized resulted in constituent RLs below the respective evaluation criteria. The results table is organized by study areas from left to right: Sacramento River Basin and San Joaquin River Basin. The table is also arranged by constituent from top to bottom: field, bacteria, general chemistry, nutrients, metals, herbicides, pesticides, organics, and dioxins/furans. Shaded results have exceeded the evaluation criteria. Evaluation criteria (Title 22, CTR, etc.) and their sources are listed in Attachment 2. Note that not all of the analyzed constituents listed in Table 2 have water quality evaluation criteria.

For all constituents with a result that was below RL or a flagged estimated concentration, <RL was used. RLs for some constituents can vary depending on dilution factor, EPA method, and/or laboratory.

Table 2 Summary Results: Sacramento and San Joaquin River Basin

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Field													
Dissolved Oxygen	NA	mg/L	2.59	5.60	8.69	8.32	5.63	6.64	6.04	12.4	8.28	12.1	7.79
pH	NA	units	7.57	7.52	7.77	8.05	7.44	7.62	7.34	8.08	7.69	8.82	8.65
Specific Conductivity	NA	µS/cm	646	283	133	103	1060	857	858	2260	546	361	1850
Turbidity	NA	NTU	25.2	13.1	6.48	6.02	95.9	57.3	34.8	64.4	13.4	6.94	46.5
Water Temperature	NA	°C	25.1	25.7	22.1	23.6	23.5	24.4	23.9	25.1	26.7	28.4	32.1
Bacteria													
E. coli	1.0--2419.6	MPN/100mL	22.1	32.3	10.8	9.70	90.8	28.8	108	62.4	517	98.5	40.2
General Chemistry													
Ammonia as Nitrogen	0.1	mg/L	0.1	0.1	0.1	0.1	0.3	0.3	0.1	<0.1	0.2	0.1	0.2
Boron	50--100	ug/L	349	<100	48.8	22.8	365	219	290	1620	65.7	124	901
Calcium	0.1-0.2	mg/L	31.4	23.4	10.3	9.30	50.2	42.0	37.4	87.9	21.7	20.8	54.4
Chloride	0.5	mg/L	26	3.7	3.1	2.0	180	110	140	350	54	45	300
Fluoride	0.1	mg/L	0.5	0.1	0.08	0.06	0.2	0.2	0.2	0.3	0.1	<0.1	0.2
Magnesium	0.05--1.0	mg/L	21.8	16.3	4.44	3.47	24.4	17.9	18.0	56.7	6.32	8.89	84.9
Perchlorate	2	ug/L	<2	<2	<2	<2	6	<2	4	<2	<2	<2	<2
Sodium	0.2--0.4	mg/L	73.2	13.4	6.66	3.86	135	97.8	99.4	308	71.0	32.9	198

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
General Chemistry													
Sulfate as SO4	0.5	mg/L	88	8.3	3.8	3.3	120	77	89	420	50	28	270
Total Alkalinity	5	mg/L	230	160	62	48	130	130	98	210	98	74	220
Total Dissolved Solids	15	mg/L	387	181	90	64	638	488	479	1390	320	194	1100
Total Hardness	5	mg/L	190	140	52	48	240	190	190	480	88	96	530
Nutrients													
Nitrate as Nitrogen	0.11	mg/L	<0.11	<0.11	<0.11	<0.11	0.57	0.84	0.45	0.67	6.7	0.26	5.3
Nitrite as Nitrogen	0.15	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15	<0.15
Metals													
Total Aluminum	50	ug/L	1610	1070	360	332	3460	3600	1760	2030	554	263	1560
Total Arsenic	10--20	ug/L	<10	<20	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total Iron	20	ug/L	1600	1030	403	386	4060	2970	2000	2220	550	476	1770
Total Lead	5--10	ug/L	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Manganese	10	ug/L	231	123	14.0	27.6	516	192	201	613	66.8	89.6	93.5
Dissolved Aluminum	50	ug/L	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Dissolved Arsenic	10	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Dissolved Iron	20	ug/L	<20	22	33	65	<20	23	<20	<20	<20	<20	24
Dissolved Lead	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Metals													
Total Antimony	10--20	ug/L	<10	<20	<10	<10	<10	<10	<10	<10	<10	<10	<10
Total Barium	5	ug/L	82.9	62.1	17.8	14.2	96.2	77.7	61.6	115	54.2	31.6	88.0
Total Beryllium	5--10	ug/L	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Cadmium	5--10	ug/L	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Chromium	5--10	ug/L	<5	<10	<5	<5	<5	<5	<5	6	<5	<5	10
Total Chromium IV	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total Copper	5--10	ug/L	<5	<10	<5	<5	<5	<5	<5	<5	5	<5	5.5
Total Nickel	5--10	ug/L	6.5	<10	<5	<5	<5	<5	<5	7.3	<5	<5	9.4
Total Selenium	20--40	ug/L	<20	<40	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Silver	5--10	ug/L	<5	<10	<5	<5	<5	<5	<5	<5	<5	<5	<5
Total Thallium	20--40	ug/L	<20	<40	<20	<20	<20	<20	<20	<20	<20	<20	<20
Total Titanium	50	ug/L	74	62	<50	<50	170	220	85	74	<50	<50	54
Total Zinc	10	ug/L	<10	<20	<10	<10	<10	<10	<10	<10	19	<10	<10
Herbicides													
2,4,5-T	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-TP (Silvex)	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4-D	0.4	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Herbicides													
2,4-DB	0.8	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
3,5-Dichlorobenzoic acid	0.8	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
4-Nitrophenol	0.6	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Acifluorfen	0.8	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Bentazon	0.6	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Chloramben	0.8	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Dalapon	0.6	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
DCPA	0.4	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Dicamba	0.4	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Dichloroprop	0.8	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Dinoseb	0.4	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
MCPP	10	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	0.3	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Picloram	0.8	ug/L	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Pesticides													
4,4'-DDD	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDE	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Pesticides													
4,4'-DDT	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-Chlordane	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
beta-BHC	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bolstar	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Coumaphos	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
delta-BHC	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Demeton	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Demeton-O	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Demeton-S	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Diazinon	0.25	ug/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Dichlorvos	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Dieldrin	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Disulfoton	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

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			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Pesticides													
Dursban (Chlorpyrifos)	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endosulfan I	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulfate	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin aldehyde	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPN	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ethoprop	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fensulfothion	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fenthion	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
gamma-BHC (Lindane)	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Gardona (Stirophos)	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Heptachlor	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

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			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Pesticides													
Merphos	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methoxychlor	0.1	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mevinphos	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Monocrotophos	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naled	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-methyl	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Phorate	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Ronnel	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Sulfotep	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
TEPP	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Tokuthion (Prothiofos)	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toxaphene	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloronate	0.2	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Organics													
1,1,1,2-Tetrachloroethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Organics													
1,1,2,2-Tetrachloroethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloropropene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichlorobenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichloropropane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trimethylbenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromo-3-chloropropane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromoethane (EDB)	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Organics													
2,2-Dichloropropane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,4,5-Trichlorophenol	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2,4,6-Trichlorophenol	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2,4-Dichlorophenol	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2,4-Dimethylphenol	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2,4-Dinitrophenol	10	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2,6-Dinitrotoluene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-Butanone	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Chloronaphthalene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-Chlorophenol	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-Chlorotoluene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Hexanone	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Methylnaphthalene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-Methylphenol	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-Nitroaniline	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
2-Nitrophenol	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5

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Organics													
3-Nitroaniline	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
4,6-Dinitro-2-methylphenol	10	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Bromophenyl phenyl ether	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
4-Chloro-3-methylphenol	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
4-Chloroaniline	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
4-Chlorophenyl phenyl ether	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
4-Chlorotoluene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Isopropyltoluene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Methyl-2-pentanone	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Nitroaniline	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
4-Nitrophenol	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acenaphthene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Acenaphthylene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Acetone	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Aniline	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Anthracene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Aroclor 1016	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

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Organics													
Aroclor 1221	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aroclor 1232	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aroclor 1242	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aroclor 1248	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aroclor 1254	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Aroclor 1260	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Azobenzene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Benzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo (a) anthracene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Benzo (a) pyrene	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzo (b) fluoranthene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Benzo (g,h,i) perylene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Benzo (k) fluoranthene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Benzoic acid	30	ug/L	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Benzyl alcohol	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bis(2-chloroethoxy)methane	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bis(2-chloroethyl)ether	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2

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Organics													
Bis(2-chloroisopropyl)ether	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bis(2-ethylhexyl)phthalate	5	ug/L	<5	<5	<5	<5	<5	<5	<5	21	<5	<5	22
Bromobenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromochloromethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3	<0.5	<0.5
Bromoform	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Butyl benzyl phthalate	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Carbazole	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Carbon disulfide	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12	<0.5	<0.5
Chloromethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
cis-1,2-Dichloroethene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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Organics														
cis-1,3-Dichloropropene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz (a,h) anthracene	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Dibenzofuran	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Dibromochloromethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	1	<0.5	<0.5
Dibromomethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diethyl phthalate	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Di-isopropyl ether	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethyl phthalate	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Di-n-butyl phthalate	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Di-n-octyl phthalate	5	ug/L	<5	<5	<5	<5		<5	<5	<5	<5	<5	<5	<5
Ethyl tert-Butyl Ether	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Fluorene	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Hexachlorobenzene	2	ug/L	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2
Hexachlorobutadiene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Organics													
Hexachlorocyclopentadiene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Hexachloroethane	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Indeno (1,2,3-cd) pyrene	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Iodomethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Isophorone	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Isopropylbenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m,p-Xylene	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Methyl tert-Butyl Ether	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene chloride	5	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Naphthalene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-Butylbenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrobenzene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
N-Nitrosodimethylamine	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
N-Nitrosodi-n-propylamine	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
N-Nitrosodiphenylamine	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
n-Propylbenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Organics													
Pentachlorophenol	10	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phenanthrene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Phenol	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Pyrene	2	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
sec-Butylbenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TBA	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tert-Amyl Methyl Ether	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tert-Butylbenzene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Trihalomethanes	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorotrifluoroethane	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Constituent	Reporting Limit (RL)	Unit	Sacramento River				San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona	Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Organics													
Vinyl chloride	0.5	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes, total	1	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dioxins/Furans													
1,2,3,4,6,7,8-HpCDD	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,4,6,7,8-HpCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,4,7,8,9-HpCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,4,7,8-HxCDD	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,4,7,8-HxCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,6,7,8-HxCDD	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,6,7,8-HxCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,7,8,9-HxCDD	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,7,8,9-HxCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,7,8-PeCDD	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
1,2,3,7,8-PeCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
2,3,4,6,7,8-HxCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
2,3,4,7,8-PeCDF	50	pg/l	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
2,3,7,8-TCDD	10	pg/l	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

Constituent	Reporting Limit (RL)	Unit	Sacramento River					San Joaquin River						
			Colusa Basin Drain above Knights Landing	Sutter Bypass downstream of Obanion Outfall	Sacramento River at Rough and Ready Pumping Plant	Sacramento River below Verona		Salt Slough at Lander Ave	Salt Slough at Sand Dam	Boundary Drain at SLCC Sampling Station	San Joaquin River at Crows Landing	Harding Drain	San Joaquin River at Airport Way Near Vernalis	Del Puerto Creek at Vineyard Road
Dioxins/Furans														
2,3,7,8-TCDF	10	pg/l	<10	<10	<10	<10		<10	<10	<10	<10	<10	<10	<10
OCDD	100	pg/l	<100	<100	<100	<100		<100	<100	<100	<100	103	<100	281
OCDF	100	pg/l	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100	<100
TEQ		pg/l	0.12	0.01	0.00	0.02		0.02	0.02	0.01	0.02	0.18	0.02	0.02
Total HpCDD	50	pg/l	<50	<50	<50	<50		<50	<50	<50	<50	<50	<50	75
Total HpCDF	50	pg/l	<50	<50	<50	<50		<50	<50	<50	<50	<50	<50	<50
Total HxCDD	50	pg/l	<50	<50	<50	<50		<50	<50	<50	<50	<50	<50	<50
Total HxCDF	50	pg/l	<50	<50	<50	<50		<50	<50	<50	<50	<50	<50	<50
Total PeCDD	50	pg/l	<50	<50	<50	<50		<50	<50	<50	<50	<50	<50	<50
Total PeCDF	50	pg/l	<50	<50	<50	<50		<50	<50	<50	<50	<50	<50	<50
Total TCDD	10	pg/l	<10	<10	<10	<10		<10	<10	<10	<10	<10	<10	<10
Total TCDF	10	pg/l	<10	<10	<10	<10		<10	<10	<10	<10	<10	<10	<10

NOTE: Solid shaded boxes indicate an exceedance of evaluation criteria.

5.0 DISCUSSION

As documented in Table 2, herbicides, pesticides, organics, and dioxins/furans concentrations were all below RLs except for two constituents: trihalomethanes (chloroform, bromodichloromethane, and dibromochloromethane) and bis (2-ethylhexyl) phthalate. Some field parameters, one E. coli sample, and a few general chemistry constituents and trace elements had concentrations that exceeded evaluation criteria at certain sites. Total aluminum, total iron, and total manganese were found at concentrations exceeding their evaluation criteria (200 µg/L, 300 µg/L, and 50 µg/L, respectively) at all sites—except for total manganese at the two sites sampled in the Sacramento River.

Although turbidity has a Secondary MCL evaluation criterion of 5 NTU, background concentrations can be highly variable. The Basin Plan has a specific water quality objective for turbidity that takes into account the variability of natural turbidity. The Secondary MCL of 5 NTU is strictly used as a tool for evaluation.

Although dissolved aluminum, iron, and manganese do not have evaluation criteria, they are evaluated against the Secondary MCL of total aluminum, iron, and manganese (200 µg/L, 300 µg/L, and 50 µg/L, respectively). The purpose of presenting dissolved aluminum, iron, and manganese results is to provide water quality of drinking water that uses conventional treatments such as filtration.

Although there is no MUN water quality criterion for *E. coli*, *E. coli* is evaluated against the USEPA Recreational Guideline for Designated Beach Area at 235 MPN/100mL (USEPA, 1986). This numeric water quality criterion is strictly used as a tool for evaluation to put values in to context in terms of spatial and temporal trends. The purpose of this study was not designed to evaluate the impacts of pathogens on recreational water. Since the USEPA Recreational Guideline for Designated Beach Area was used for the 18-month Sacramento Case Study, the same guideline will be used in this study for consistency. There is new pathogen regulations established based on the must current scientific information by the USEPA (USEPA, 2012).

Results are discussed in more detail within individual river basin sections below.

5.1 Sacramento River Basin

A total of five constituents had elevated concentrations in the Sacramento River Basin: turbidity, sodium, total aluminum, total iron, and total manganese.

Exceedances for three of the five constituents occurred at all sites, both the Ag drains and main stems of the river. Turbidity was elevated above its Secondary MCL of 5 NTU. Total aluminum, and total iron concentrations exceeded their Secondary MCL of 200 µg/L and 300 µg/L, respectively. Highest concentrations of turbidity, total aluminum, and total iron ranged up to 25.2 NTU, 1610 µg/L, and 1600 µg/L, respectively at Colusa Basin Drain above Knights Landing.

Although exceedances of turbidity, total aluminum, and total iron occurred at every site, concentrations in Ag drains were higher than in the Sacramento River. Ag drain concentrations of these constituents ranged from 3 to 8 times higher than the evaluation criteria, whereas the Sacramento River had concentrations that were less than double the evaluation criteria. Total aluminum, total iron, and turbidity concentrations were relatively similar between Sacramento River at Rough and Ready Pumping Plant (upstream site) and Sacramento River below Verona (downstream site) even though Sacramento River below Verona possibly included mixture of the Feather River. The high concentration levels of these constituents in the Ag drains did not seem to cause the Sacramento River to exceed water quality criteria.

All dissolved aluminum concentrations were below the RL (50 µg/L). Concentrations of dissolved iron ranged from less than 20 µg/L to 65 µg/L with the highest concentrations in the Sacramento River.

Conversely, only the Ag drain sites showed elevated levels of sodium and total manganese. Sodium exceeded the USEPA Drinking Water Advisory[1] of 20 mg/L at Colusa Basin Drain above Knights Landing with a concentration of 73.2 mg/L. Total manganese exceeded the Secondary MCL of 50 µg/L at both Colusa Basin Drain above Knights Landing and Sutter Bypass downstream of Obanion Outfall site. Highest total manganese concentration reached 231 µg/L.

Exceedances of total aluminum, iron, and manganese seem to correlate to historical background concentrations of metals in the surface waters of the Sacramento River Basin. The Sacramento River Watershed Sanitary Survey 2010 Update evaluation found high levels of aluminum, iron, and manganese that exceeded MCLs in the Sacramento River based on data collected by the intakes and/or various monitoring programs. A literature review of the Colusa Basin Drain water quality indicated that levels of iron and manganese often exceeded recommended limits for municipal usage from 1968 to 1971 (Turek, 1990).

[1] **USEPA Drinking Water Advisory for persons on restricted sodium diet.**

5.2 San Joaquin River Basin

A total of fifteen constituents had elevated concentrations in the San Joaquin River Basin: pH, specific conductance (SC), turbidity, *E. coli*, boron, chloride, perchlorate, sodium, sulfate, total dissolved solids (TDS), total aluminum, total iron, total manganese, trihalomethanes, and bis (2-ethylhexyl) phthalate.

Exceedances for five of the fifteen constituents occurred at all sites. Turbidity was elevated above its evaluation criteria of 5 NTU. Sodium, total aluminum, total iron, and total manganese exceeded their evaluation criteria of 20 mg/L, 200 µg/L, and 300 µg/L, 50 µg/L, respectively. Highest concentrations of turbidity, sodium, total aluminum, total iron, and total manganese ranged up to 95.9 NTU at Salt Slough at Lander Avenue, 308 mg/L at San Joaquin River at Crows Landing, 3600 µg/L at Salt Slough at Sand Dam, 4060 µg/L Salt Slough at Lander Avenue, and 613 µg/L at San Joaquin River at Crows Landing, respectively.

Generally, concentration levels of turbidity, sodium, total aluminum, total iron, and total manganese increased as water moved downstream from Boundary Drain at SLCC Sampling Station to San Joaquin River at Crows Landing. Eastside flows from Harding Drain tended to have lower constituent concentrations than Crows Landing while westside flows from Del Puerto Creek at Vineyard Road had higher constituent concentrations. Constituent concentrations tended to be lowest at the furthest downstream site (San Joaquin River at Airport Way near Vernalis) due to the dilution of Ag drainage by the main river stem. With the available data, we cannot say that the Ag drains had caused the San Joaquin River to exceed water quality criteria.

All dissolved aluminum concentrations were below the RL (50 µg/L). Dissolved iron was only detected above the 20 µg/L RL in two sites in the San Joaquin River Basin (at 23 µg/L and 24 µg/L); concentrations were less than the evaluation criterion.

The pH value, SC, chloride, sulfate, and TDS exceeded their evaluation criteria of 8.5 units, 900 µmhos/cm, 250 mg/L, 250 mg/L, and 500 mg/L, respectively, in the San Joaquin River Basin, though not in all sites. These exceedances occurred mostly in San Joaquin River at Crows Landing, Del Puerto Creek at Vineyard Road and/or Salt Slough at Lander Avenue and had concentrations that were less than double the evaluation criteria. Bis (2-ethylhexyl) phthalate had exceeded its evaluation criteria of 1.8 µg/L at San Joaquin River at Crows Landing and Del Puerto Creek at Vineyard Road as well. It is not clear whether the water quality data of Bis (2-ethylhexyl) phthalate was influenced by a common laboratory error (ATSDR, 2002).

Perchlorate, chloroform, bromodichloromethane, and dibromochloromethane exceeded their criteria of 6 µg/L, 1.8 µg/L[2], 0.56 µg/L, and 0.41 µg/L, respectively only in San Joaquin River Basin Ag drains. *E. coli* was elevated above its criteria of 200 MPN/100mL. Perchlorate was exceeded at Salt Slough with a concentration of 6.31 µg/L, just above the evaluation criteria. *E. coli* was elevated at Harding Drain with a concentration of 517 MPN/100mL. Along with *E. coli*, elevated concentrations of trihalomethanes were also found at Harding Drain. According to an Administrative Civil Liability (ACL) Complaint that was filed by the Central Valley Water Board on March 7, 2014, the City of Turlock had issues with elevated concentrations of trihalomethanes in their wastewater treatment facility effluent which eventually makes its way

[2] Cal/EPA Cancer Potency Factor as a drinking water level assuming 70 kg body weight and 2 liters per day drinking water consumption.

into Harding Drain. It is not clear whether the effluent discharges influenced water quality during this sampling period.

Boron was elevated above its criteria of 1000 µg/L only at the San Joaquin River at Crows Landing with a concentration of 1620 µg/L.

6.0 SUMMARY/CONCLUSION

This study was designed to determine if Ag return flows exceed or cause the main stems of the Sacramento and/or San Joaquin Rivers to exceed MCLs specified in provisions of Title 22 of the California Code of Regulations, CTR criteria, and other numeric water quality criteria listed in Attachment 2 for constituents without a MCL or CTR during the irrigation period.

When analyzing the water quality results collected from the Sacramento River and San Joaquin River Basins against the evaluation criteria listed in Attachment 2, most constituents (total 258 out of 275) were below the evaluation criteria and/or analytical reporting limits. In general, for the constituents consistently identified at concentrations above the evaluation criteria (turbidity, total aluminum, total iron and total manganese), the furthest downstream main stem river sites reported the lowest concentration with Ag drainage from the western side of each basin containing the highest concentrations. Dissolved concentrations for aluminum and iron were below evaluation criteria.

Concentrations of SC in San Joaquin River Basin sites ranged from 361 µmhos/cm to 2260 µmhos/cm as compared to Sacramento River Basin sites which ranged from 103 µmhos/cm to 646 µmhos/cm. The San Joaquin River Basin also had more constituents that exceeded evaluation criteria than Sacramento River Basin. For those constituents that were elevated at both the Ag drain and river stem sites, concentrations were much higher in the Ag drains than the main river stem sites.

Total manganese and sodium were elevated at every site in the San Joaquin River Basin, but only elevated at Ag drains in the Sacramento River Basin. Concentrations of SC in the San Joaquin River Basin are a lot higher than the Sacramento River Basin. The different geology in the San Joaquin River Basin that lead to a sodium-sulfate dominated system rather than a sodium chloride system in the Sacramento River Basin may explain the difference in SC between the two river basins.

The collected samples were representative of the main Ag drains, the Sacramento River, and San Joaquin River; however, samples collected at the main river stems may not necessarily represent a good mixture of Ag drain flows. With limited funding, the amounts of sampling sites were restricted. At this time, we can say that Sacramento Ag drains did not caused the Sacramento River to exceed water quality criteria; meanwhile, it is difficult to determine if San Joaquin Ag drains caused the San Joaquin River to exceed water quality criteria due to limited data.

Only 17 criteria developed to protect human health were exceeded. Some constituents with elevated concentrations appear to be linked to geology of the river basins (e.g., sodium and SC), while others have been correlated to historical background concentrations of metals in the surface waters of the Sacramento River Basin (e.g., total aluminum, iron and manganese).

For future studies, a sample would be collected directly upstream and downstream of every major water body to characterize the Sacramento River and San Joaquin River Basins.

7.0 REFERENCES

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ATTACHMENT 1: SITE PHOTOS

A1: *Sacramento River Basin Sites*

520CBDKLU—Colusa Basin Drain above Knights Landing
520CRCOOH—Sutter Bypass downstream of Obanion Outfall
520YOL001—Sacramento River at Rough and Ready Pumping Plant
519SACVER—Sacramento River below Verona

A2: *San Joaquin River Basin Sites*

541MER531—Salt Slough at Lander Avenue
541XSSASD—Salt Slough at Sand Dam
541MER050—Boundary Drain at SLCC Sampling Station
535STC501—San Joaquin River at Crows Landing
541SJC501—Harding Drain
541SJC501—San Joaquin River at Airport Way near Vernalis
541STC516—Del Puerto Creek at Vineyard Road

A1: Sacramento River Basin—Colusa Basin Drain above Knights Landing (520CBDKLU)


Upstream


Between Banks


Downstream

A1: Sutter Bypass downstream of Obanion Outfall (520CRCOOH)


Upstream


Between Banks


Downstream

A1: Sacramento River at Rough and Ready Pumping Plant (520YOL001)

		
Upstream	Between Banks	Downstream

A1: Sacramento River below Verona (519SACVER)

		
Upstream	Between Banks	Downstream

A2: San Joaquin River Basin—Salt Slough at Lander Avenue (541MER531)

Upstream

Between Banks

Downstream

A2: Salt Slough at Sand Dam (541XSSASD)

Upstream

Between Banks

Downstream

Sampling Station

A2: Boundary Drain at SLCC Sampling Station (541MER050)

		
Upstream	Between Banks	Downstream

A2: San Joaquin River at Crows Landing (535STC504)

		
Upstream	Between Banks	Downstream

A2: Harding Drain (535STC501)

Between Banks

Downstream

A2: San Joaquin River at Airport Way near Vernalis (541SJC501)

Upstream

Between Banks

Downstream

A2: Del Puerto Creek at Vineyard Road (541STC516)

		
Upstream	Between Banks	Downstream

ATTACHMENT 2: PARAMETERS AND CRITERIA (Updated on March 16, 2015)

The following list all of the constituents that have MUN water quality evaluation criteria. This list does not include all drinking water evaluation criteria. All constituents were evaluated against MCLs specified in provisions of Title 22 of the California Code of Regulations, the CTR, and other evaluation criteria/guideline listed for constituents without a MCL or CTR criteria. Evaluation criteria were obtained from the State Water Board's Water Quality Goals Database. Please note that not all of these constituents were tested for due to scan variations provided by each laboratory.

After staff review, corrections have been made to some CTR and MCL values that contained unit conversion errors. California Department of Public Health (DPH) was changed to the State Water Resources Control Board's Division of Drinking Water (DDW) to reflect current programs. Other evaluation criteria/guidelines have been removed unless the constituent does not have a MCL or CTR criteria to reduce confusion. An acronym key was added for clarification.

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
1,1,1-Trichloroethane	0.200 mg/L			
1,1,2,2-Tetrachloroethane	0.001 mg/L		0.00017 mg/L	
1,1,2,Trichloro-1,2,2-Trifluoroethane (Freon 113)	1.2 mg/L			
1,1,2-Trichloroethane	0.005 mg/L		0.0006 mg/L	
1,1-Dichloroethane	0.005 mg/L			
1,1-Dichloroethylene	0.006 mg/L		0.000057 mg/L	
1,2,4-Trichlorobenzene	0.005 mg/L			
1,2,4-Trimethylbenzene				0.33 mg/L [DDW Notification Level for drinking water]
1,2-Dibromo-3chloropropane (DBCP)	0.0002 mg/L			
1,2-Dibromoethane (Ethylene Dibromide) (EDB)	0.00005 mg/L			
1,2-Dichlorobenzene	0.6 mg/L		2.7 mg/L	
1,2-Dichloroethane (Ethylene dichloride)	0.0005 mg/L		0.00038 mg/L	
1,2-Dichloropropane	0.005 mg/L		0.00052 mg/L	

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
1,2-Diphenylhydrazine			0.000040 mg/L	
1,3 Dichlorobenzene			0.400 mg/L	
1,3,5-Trimethylbenzene				0.33 mg/L [DDW Notification Level for drinking water]
1,3-Dichloropropene	0.0005 mg/L		0.01 mg/L	
1,4-Dichlorobenzene	0.005 mg/L		0.400 mg/L	
2,3,7,8-TCDD (Dioxin)	3 x 10-8 mg/L		1.3 x 10-11 mg/L	
2,4,5-TP (Silvex)	0.05 mg/L			
2,4,6-Trichlorophenol			0.0021 mg/L	
2,4-Dichlorophenol			0.093 mg/L	
2,4-Dichlorophenoxyacetic acid (2,4-D)	0.07 mg/L			
2,4-Dichlorophenoxybutyric acid (2,4-DB)				0.056 mg/L [USEPA IRIS Reference Dose]
2,4-Dimethylphenol			0.540 mg/L	
2,4-Dinitrophenol			0.070 mg/L	
2,4-Dinitrotoluene			0.00011 mg/L	
2-Chloronaphthalene			1.7 mg/L	
2-Chlorophenol			0.120 mg/L	
2-Methyl-4,6-Dinitrophenol			0.0134 mg/L	
3,3'-Dichlorobenzidine			0.00004 mg/L	
4,4'-DDD			0.00000083 mg/L	
4,4'-DDE			0.00000059 mg/L	
4,4'-DDT			0.00000059 mg/L	
Acenaphthene			1.2 mg/L	
Acrolein			0.320 mg/L	
Acrylonitrile			0.000059 mg/L	
Alachlor	0.002 mg/L			
Aldrin			0.00000013 mg/L	

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
Alpha-BHC (alpha-Benzene hexachloride)			0.0000039 mg/L	
Aluminum	1.0 mg/L	0.2 mg/L		
Ammonia				1.5 mg/L [Odor Threshold (Amoore and Hautala)]
Anthracene			9.6 mg/L	
Antimony	0.006 mg/L		0.014 mg/L	
Arsenic	0.010 mg/L			
Asbestos	7 Million Fibers per Liter		7 Million Fibers/Liter	
Atrazine	0.001 mg/L			
Barium	1.0 mg/L			
Bentazon	0.018 mg/L			
Benzene	0.001 mg/L		0.0012 mg/L	
Benzidine			0.00000012 mg/L	
Benzo(a)Anthracene [1,2-Benzanthracene]			0.0000044 mg/L	
Benzo(a)pyrene	0.0002 mg/L		0.0000044 mg/L	
Benzo(b)Fluoranthene [3,4-Benzofluoranthene]			0.0000044 mg/L	
Benzo(k)Fluoranthene			0.0000044 mg/L	
Beryllium	0.004 mg/L			
Beta/photon emitters	4 millirem/year annual dose equivalent to the total body or any internal organ			
Beta-BHC (beta-Benzene hexachloride)			0.000014 mg/L	
Bis(2-Chloroethyl)Ether			0.000031 mg/L	
Bis(2-Chloroisopropyl)Ether			1.400 mg/L	

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
Boron				1 mg/L [DDW Notification Level for Drinking Water]
Bromoform			0.0043 mg/L	
Butylbenzyl Phthalate			3.0 mg/L	
Cadmium	0.005 mg/L			
Carbofuran	0.018 mg/L			
Carbon Tetrachloride	0.0005 mg/L		0.00025 mg/L	
Chlordane	0.0001 mg/L		0.00000057 mg/L	
Chloride		250 mg/L		
Chlorobenzene (Monochlorobenzene)	0.070 mg/L		0.680 mg/L	
Chlorodibromomethane			0.000401 mg/L	
Chloroform				0.0018 mg/L [CalEPA Cancer Potency Factor as a drinking water level (assume 70kg body weight & 2 liters per day drinking water consumption]
Chlorpyrifos				0.002 mg/L [USEPA, OPP Drinking Water Health Advisory - non-cancer]
Chromium	0.05 mg/L			
Chromium VI (Hexavalent Chromium)	0.010 mg/L			
Chrysene			0.0000044 mg/L	
Cis1,2-Dichloroethylene	0.006 mg/L			
Color		15 Units		
Copper		1.0 mg/L	1.3 mg/L	
Cyanide	0.15 mg/L		0.700 mg/L	
Dalapon	0.2 mg/L			
Di(2-ethylhexyl)adipate	0.4 mg/L			
Di(2-ethylhexyl)phthalate (DEHP) (Bis(2-ethylhexyl)	0.004 mg/L			

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
phthalate)				
Diazinon				0.0012 mg/L [DDW Notification Level for drinking water]
Dibenzo(ah)Anthracene			0.0000044 mg/L	
Dichlorobromomethane			0.00056 mg/L	
Dichloromethane (Methylene Chloride)	0.005 mg/L		0.0047 mg/L	
Dieldrin			0.00000014 mg/L	
Diethyl Phthalate			23 mg/L	
Di-isopropyl ether (Isopropyl ether) (DIPE)				0.0008 mg/L [Odor Threshold (Amoore and Hautala)]
Dimethyl Phthalate			313 mg/L	
Di-n-Butyl Phthalate			2.7 mg/L	
Dinoseb	0.007 mg/L			
Diquat	0.02 mg/L			
E. coli				235 MPN/100 mL [USEPA Recreational Guideline for Designated Beach Areas (Upper 75% Confidence Level)]
Endosulfan I (Alpha-Endosulfan)			0.110 mg/L	
Endosulfan II (Beta-Endosulfan)			0.110 mg/L	
Endosulfan Sulfate			0.110 mg/L	
Endothall	0.1 mg/L			
Endrin	0.002 mg/L		0.00076 mg/L	
Endrin Aldehyde			0.00076 mg/L	
Ethylbenzene	0.3 mg/L		3.1 mg/L	
Fluoranthene			0.3 mg/L	
Fluorene			1.3 mg/L	

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
Fluoride	2.0 mg/L			
Foaming Agents (MBAS)		0.5 mg/L		
Gamma-BHC (gamma-Benzene hexachloride) (Lindane)	0.0002 mg/L		0.000019 mg/L	
Glyphosate	0.7 mg/L			
Gross Alpha particle activity (excluding radon and uranium)	15 pCi/L			
Haloacetic acids (HAAs)	0.060 mg/L			
Heptachlor	0.0004 mg/L		0.00001 mg/L	
Heptachlor Epoxide	0.0002 mg/L		0.00001mg/L	
Hexachlorobenzene	0.001 mg/L		0.00000075 mg/L	
Hexachlorobutadiene			0.00044 mg/L	
Hexachlorocyclopentadiene	0.05 mg/L		0.240 mg/L	
Hexachloroethane			0.0019 mg/L	
Indeno(1,2,3-cd) Pyrene			0.0000044 mg/L	
Iron		0.3 mg/L		
Isophorone			0.0084 mg/L	
Lead	0.015 mg/L			
Manganese		0.05 mg/L		
Mercury	0.002 mg/L		0.000050 mg/L	
Methoxychlor	0.03 mg/L			
Methyl Bromide (Bromomethane)			0.048 mg/L	
Methyl-tert-butyl ether (MTBE)	0.013 mg/L	0.005 mg/L		
Molinate	0.02 mg/L			
Nickel	0.100 mg/L		0.61 mg/L	
Nickel	0.1 mg/L		0.610 mg/L	

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
Nitrate (as NO3)	45 mg/L			
Nitrate+Nitrite (sum as nitrogen)	10 mg/L			
Nitrite (as Nitrogen)	1.0 mg/L			
Nitrobenzene			0.017 mg/L	
N-Nitrosodimethylamine (NDMA)			0.00000069 mg/L	
N-Nitrosodi-n-Propylamine			0.000005 mg/L	
N-Nitrosodiphenylamine			0.005 mg/L	
Odor		3 TON (Threshold units)		
Oxamyl	0.05 mg/L			
Pentachlorophenol	0.001 mg/L		0.00028 mg/L	
Perchlorate	0.006 mg/L			
pH		6.5 - 8.5 units		
Phenol			21.0 mg/L	
Picloram	0.5 mg/L			
Polychlorinated Biphenyls (PCBs)	0.0005 mg/L		0.00000017 mg/L	
Pyrene			0.960 mg/L	
Radium-226	5 pCi/L (combined radium-226 & -228)			
Radium-228	5 pCi/L (combined radium-226 & -228)			
Selenium	0.05 mg/L			
Silver		0.1 mg/L		
Simazine	0.004 mg/L			
Sodium				20 mg/L [USEPA Drinking Water Advisory (for persons on restricted sodium diet)]

Analyte	Primary MCL	Secondary MCL	CTR	Other Evaluation Criteria/Guidelines (if applicable)
Specific Conductance		900 µS/cm		
Strontium-90	8 pCi/L (=4 millirem/yr dose to bone marrow)			
Styrene	0.1 mg/L			
Sulfate		250 mg/L		
Tetrachloroethylene (Tetrachloroethene) (PCE)	0.005 mg/L		0.0008 mg/L	
Thallium	0.002 mg/L		0.0017 mg/L	
Thiobencarb	0.07 mg/L	0.001 mg/L		
Toluene	0.15 mg/L		6.800 mg/L	
Total Dissolved Solids		500 mg/L		
Total Triahlomethanes	0.080 mg/L			
Toxaphene	0.003 mg/L		0.00000073 mg/L	
Trans-1,2-Dichloroethylene	0.01 mg/L		0.700 mg/L	
Trichloroethylene (TCE)	0.005 mg/L		0.0027 mg/L	
Trichlorofluoromethane (Freon 11)	0.15 mg/L			
Tritium	20000 pCi/L (=4 millirem/yr dose to total body)			
Turbidity		5 NTU		
Uranium	20 pCi/L			
Vanadium				0.05 mg/L [DDW Notification Level for drinking water]
Vinyl Chloride	0.0005 mg/L		0.002 mg/L	
Xylenes	1.750 mg/L			
Zinc		5.0 mg/L		

Acronyms

CalEPA	California Environmental Protection Agency
CTR	California Toxics Rule
DDW	Division of Drinking Water
IRIS	Integrated Risk Information System
MCL	Maximum Contaminant Level
OPP	Office of Pesticide Programs
USEPA	United States Environmental Protection Agency